



NASA STTR 2011 Phase I Solicitation

T2.01 Technologies for Aeronautics Experimental Capabilities

Lead Center: AFRC

The emphasis of this subtopic is proving feasibility, developing, and demonstrating technologies for advanced flight research experimentation that matures new methodologies, technologies, and concepts. It seeks advancements that promise significant gains in NASA's flight research capabilities or addresses barriers to measurements, operations, safety, and cost in all flight regimes from low sub-sonic to high supersonic. This subtopic solicits innovative technologies that enhance flight research competencies by advancing capabilities for in-flight experimentation. Proposals that demonstrate and confirm reliable application of concepts and technologies suitable for flight research and the test environment are a high priority.

Measurement techniques are needed to acquire aerodynamic, structural, flight control, and propulsion system performance characteristics to safely expand the flight envelope of aerospace vehicles. The goals are to improve the effectiveness of flight-testing by simplifying and minimizing sensor installation, measuring parameters in novel ways, improving the quality of measurements, and minimizing the disturbance to the measured parameter from the sensor presence. Sensors and systems are required to have fast response, low volume, minimal intrusion, and high accuracy and reliability.

Special areas of interest include:

- Methods and associated technologies for conducting flight research and acquiring test information in flight.
- Numerical methods for the planning, prediction, analysis and validation of flight-test experimentation.
- Sensors and data systems that have fast response, low volume, minimal intrusion, and increased accuracy and reliability.
- Innovative techniques that decrease turn-around time for inspections and assessments for safe operations of aircraft (e.g., non destructive examination of composites through ultrasonic techniques).
- Advanced design and manufacturing techniques for improved upper stage performance for nano- & small-satellite booster technologies (e.g., manufacturability, affordability, and performance of a small upper-stage booster rocket motors for small & nano-satellites).

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- Novel dynamic modeling and simulation of aircraft flight and structural control are encouraged. Control objectives include aerodynamic boundary layer and laminar flow control, autonomous and adaptive systems for improved stability, safety, performance, and drag reduction.